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(58) Field of search
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(54) Drainage device

(57) A drainage device, particularly suitable for use on a road surface (12) having a drainage galley (26) a shallow depth casting (10) for installation into the upper layers of the road surface (12) and a grating (14) for intercepting road channel water and for deflecting and accelerating the water into a pipe outlet (24) formed in a part of the casting (10) shaped to complement the road kerb or verge (20).

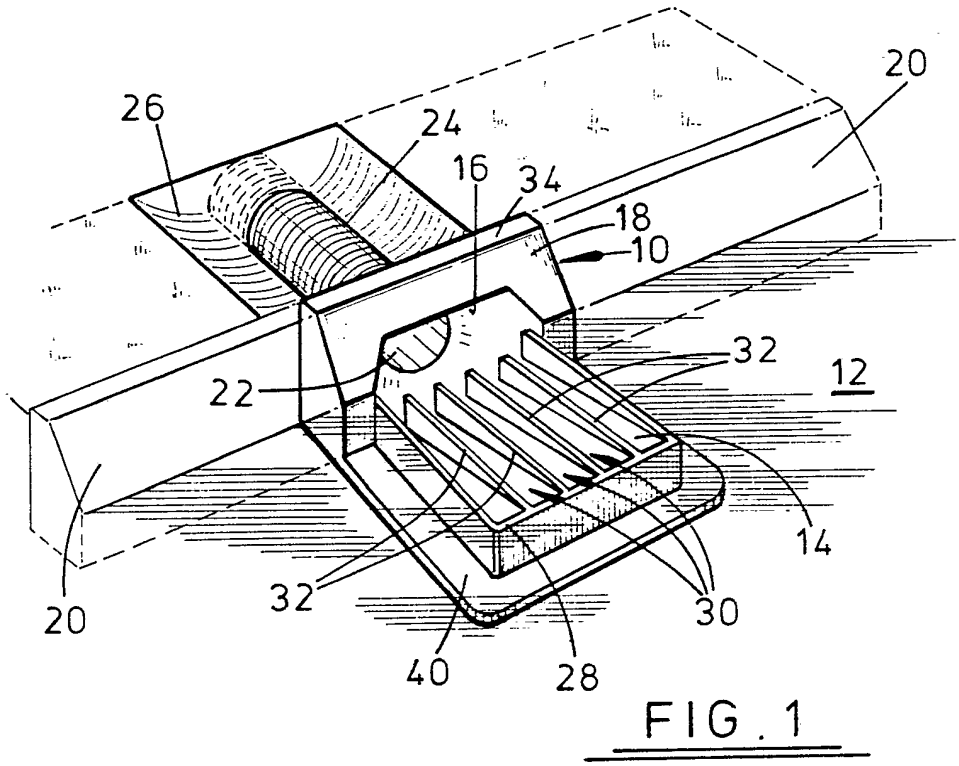

FIG. 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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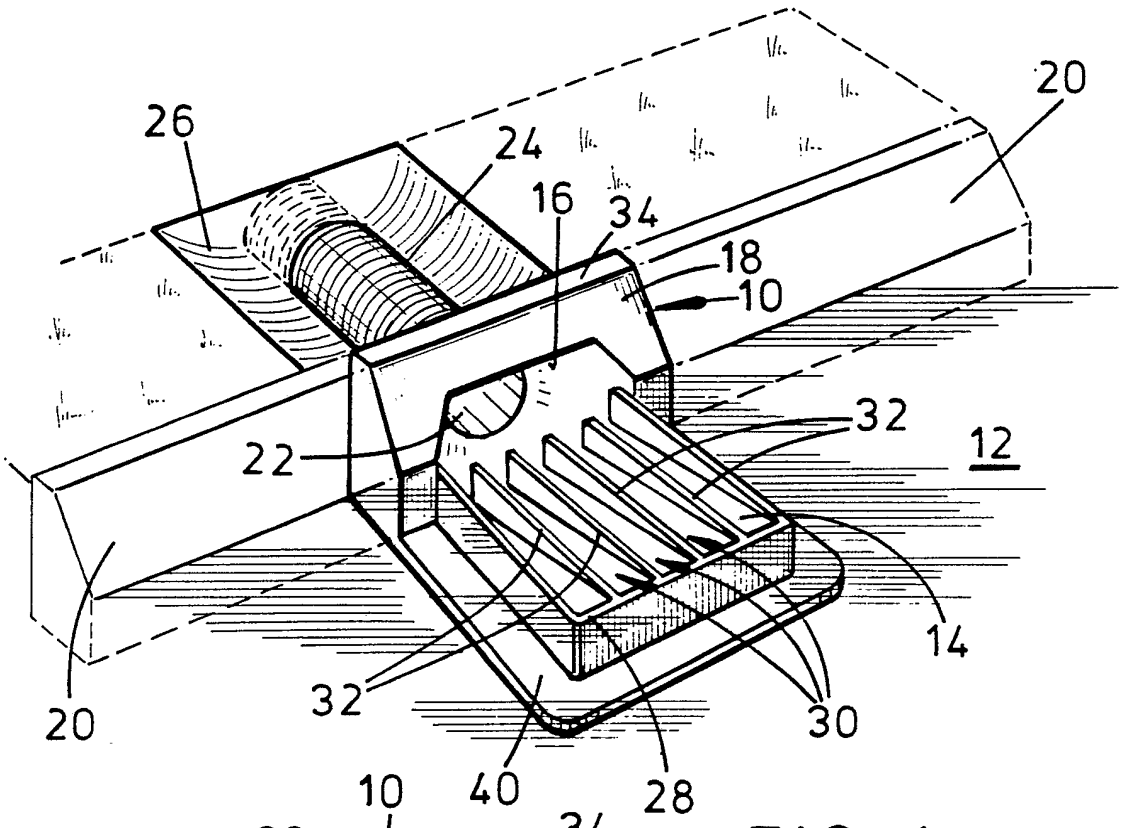

FIG : 1

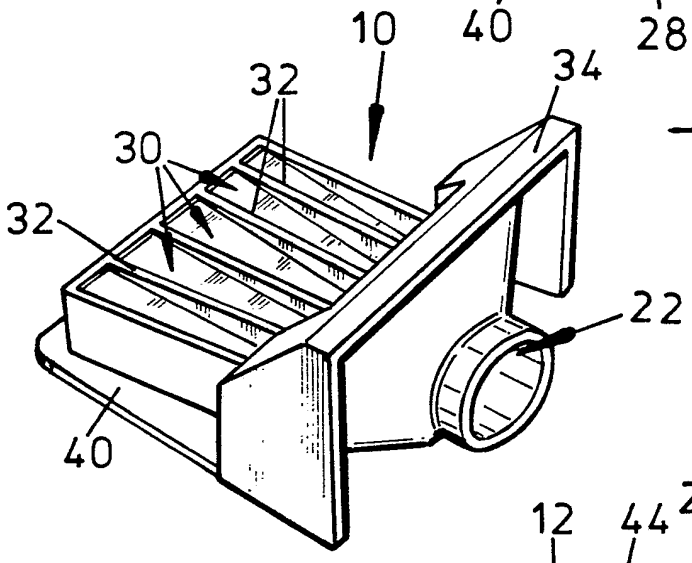

FIG. 2

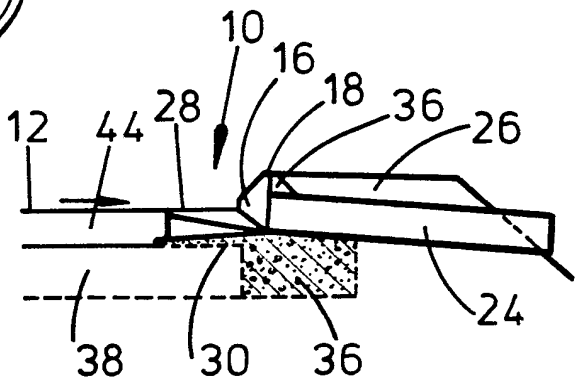

FIG. 3

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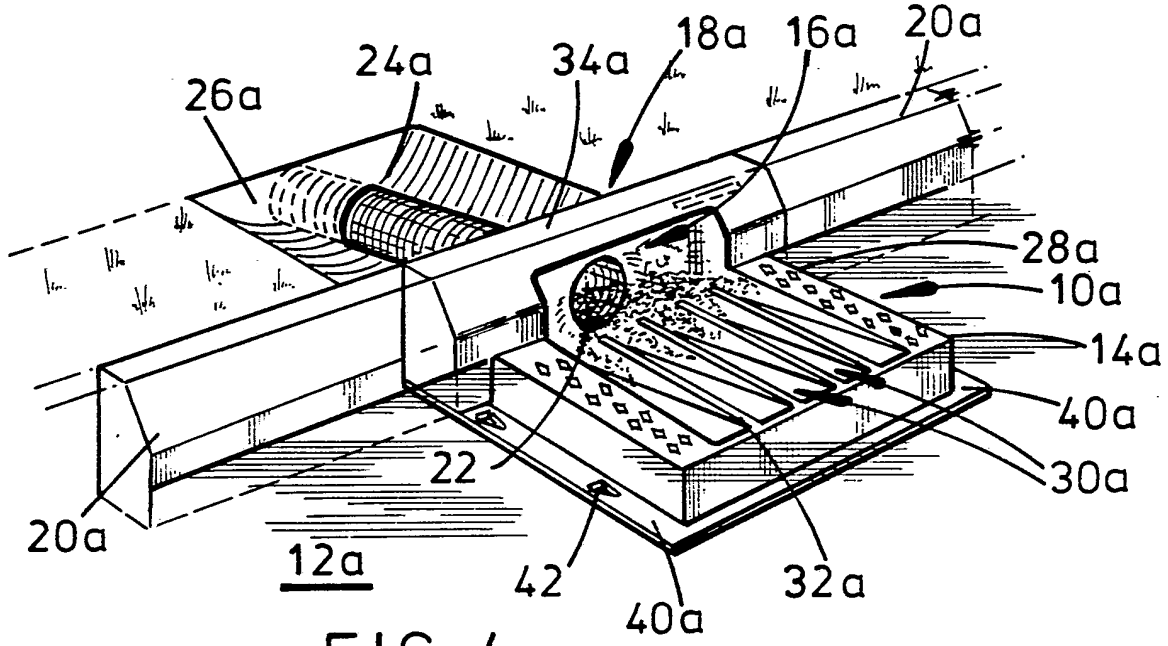

FIG. 4

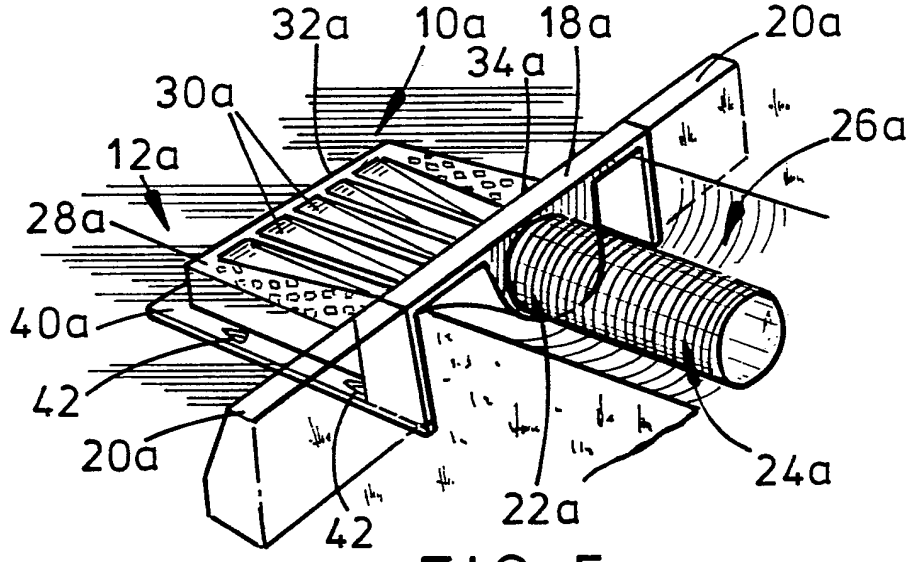

FIG. 5

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DRAINAGE DEVICE

The present invention relates to a drainage device and particularly, but not exclusively, to a drainage device for use on a road surface having an associated drainage gully.

Drainage of surface water from paved areas such as roads is usually achieved by shaping the road surface to give a lateral fall towards either or both edges of the road and where an adjacent verge or footway level is raised above the road surface, and also to give longitudinal fall along the road edge or channel. To prevent a build-up of the width and depth of water flowing in the road channel, suitable spaced discharge points are provided in the form of road gullies, gully shutes and kerb or turf offlets. If any such outlets become blocked then the width of water flow increases and may become of hazard to traffic on the road.

The road gully is an open cast grating fitted over a precast concrete, brick or plastic gully pot provided with a pipe outlet socket near the top of the pot, and the socket is connected to a pipe drain. It may be positioned within the road channel width, within the road verge or partly in the channel and partly in the verge. A gully shute is a gully without a silt trap and because of its reduced depth tends to be used where rock is encountered at, or near, road formation level.

Offlets are open channels which have been cut at a lower level than in the road surface through the verge to a carrier drain or open ditch. Road gully and gully shutes extend through the road pavement depth and may weaken the road structure whereas offlets are extremely vulnerable to blockage caused by vehicles flattening verge material and by infilling with grass cuttings, wind blown or water carried sediment.

A drainage device should satisfy a number of desirable criteria in addition to being easy to manufacture and relatively inexpensive. The drainage device should allow water on the road surface to be quickly and effectively drained to the road gully and the discharge path should be of a sufficient capacity to cope with the volume of water that is required to be drained from the road surface. The drainage device should also accelerate the water being drained to a velocity which assists in preventing and/or minimising the deposition of silt and other deleterious matter. The drainage device should be usable with a different variety of road surfaces and verges or kerbs and should be readily installed minimising the disturbance of the road surface. The drainage device should also be securely locatable on the road surface at a relatively shallow depth yet should remain securely fixed on the road surface when subjected to large forces created by traffic or the like. Also, the drainage device should

not present a hazard to traffic or pedestrians and should be sufficiently strong to resist the forces generated by traffic.

One existing drainage device consists of a kerb outlet made of ductile iron which can be located in the kerb or verge of the road. The drainage device is generally kerb shaped in cross-section and has a short road retaining bar for retaining the device in the road surface. The kerb or verge side of the device has a spigot for connection to a drainage pipe. One problem associated with this device is that water on the road surface only flows towards the drainage device because of the camber and longitudinal fall of the road. Consequently, the effectiveness of this drainage device is thus mainly dictated by its position in the road and the slope of the road. Such drainage devices have to be strategically positioned to give effective drainage.

An object of the present invention is to provide a drainage device which obviates or mitigates at least one of the aforementioned problems.

This is achieved by providing a shallow depth casting for installation into the upper layers of a road surface and which has a grating for intercepting road channel water and for deflecting and accelerating the water into a pipe outlet formed in a part of the casting shaped to compliment the road kerb or verge. The water velocity created by the casting assists in preventing

and minimising deposition of silt or similar matter.

In a preferred embodiment the drainage device is a one-piece metal casting and the grating is adapted to be disposed in the road surface so that it lies substantially flush with the road surface. The grating has five sloping channels separated by ribs and the depth of the channels increases towards the kerb shaped portion which has a integral spigot to which a drainage pipe can be coupled.

According to one aspect of the present invention there is provided a drainage device comprising grating means for intercepting and guiding fluids from a road surface to an outlet, and a kerb portion means coupled to said grating means, said kerb portion means defining said outlet.

Preferably said drainage device is a one-piece metal casting. Alternatively, said drainage device is a two-piece casting consisting of a grating casting portion and a kerb portion casting adapted to be fastened together.

Conveniently, said kerb portion includes an integral spigot which defines said outlet and is adapted to receive the end of a pipe so that water collected by the device can be fed to a drain or open water course.

Preferably, said grating has a plurality of separate channels which slope towards the kerb portion when in an in-use position, for intercepting and guiding water from

the road surface to said outlet. Conveniently, the kerb portion has a cross-plate disposed above said outlet for protecting said outlet and/or said outlet spigot. Conveniently, said kerb portion means is shaped to complement the road edge or verge.

These and other aspects of the present invention will become apparent from the following description when taken in combination with the accompanying drawings in which:-

Fig. 1 is a perspective view of a first embodiment of a drainage device, in accordance with the present invention as shown installed in a road surface;

Fig. 2 is a perspective view of the drainage device shown in Fig. 1 from another angle:

Fig. 3 is a diagrammatic side elevational view of the drainage device as shown in Fig. 1;

Fig. 4 is a perspective view of a second embodiment of a drainage device, in accordance with the present invention, shown installed in a road surface, and Fig. 5 is a perspective view of the drainage device shown in Fig. 4 from another angle.

Reference is firstly made to Figs. 1 and 2 of the drawings which are perspective front and rear views respectively of a drainage device in accordance with the present invention which is provided by a one-piece metal casting, generally indicated by reference numeral 10 and which is shown installed in the surface 12 of a road.

The casting 10 consists of a front grating portion 14 which lies flush with the road surface for intercepting and draining road surface water to a hollow recess 16 defined by a kerb portion 18 which is shown disposed in line with kerbstones 20. The recess 16 funnels into a circular outlet 22 which is shown connected to a pipe 24 which lies in a drainage open water course 26 at the side of the road so that road surface water or any other fluids for example, spills, which lie on the road surface can be intercepted by the device and transferred via the outlet 22 and pipe 24 to be discharged along the drainage open water course 26 as will be later described in detail.

The grating 14 is generally rectangular in plan view and its upper surface 28 lies substantially flush with the road surface 12. Five drainage channels 30 separated by four ribs 32 are disposed in the grating 14 and the depth of the channels 30 increases towards the recess 16, as best seen in Fig. 3 of the drawings. It will be seen that the slope of the channels 30 is significantly greater than the road camber and permits water collected on the surface 12 of the road to flow strongly towards the outlet 22 as will be described.

The kerb portion 18 as can be seen from the drawings is shaped to match the shape of the kerb stones 20 which have half-batter kerb sections. The kerb portion 18 is shaped to define recess 16 which terminates in the

outlet 22 as best seen in Fig. 2 which is shaped to receive the circular pipe 24. The top of the kerb portion 34 acts as a crossbar which protects the outlet and end of the pipe 24 in the event that wheels inadvertently pass over the device when in situ.

Reference is now made to Fig. 3 of the drawings which shows that the drainage device is held in position by concrete 36 cast around the device and between the base of the device and the road base 38. It will be seen that the three sides of the grating are provided with flanges 40 of uniform width. As best seen in Fig. 3, on installation, the flanges 40 are covered by the road surfacing material 44 which assists in preventing upward displacement of the casting 10 when overrun by traffic.

In operation, it will be appreciated that water flowing over the road surface 12 is collected in channels 30 and funnelled into recess 16 where it is collected and travels through outlet 22 into pipe 24 and thereafter to the outlet 26. The width and slope of the channels 30 are designed to give a water velocity which assists in preventing deposition of water board particles of silt and grit. A typical channel width is 40 mm and the channel slope is one in ten or greater.

Reference is now made to Figs 4 and 5 of the drawings which show a second embodiment of a drainage casting 10a where like numerals refer to like parts with

the suffix 'a' added. The casting 10a comprises a front grating portion 14a having a upper surface 28a which lies flush with the road surface 12a. Kerb portion 18a has a splay kerb section to match the kerb section of kerbstones 20a. The kerb portion 18a defines a hollow recess 16a through which the road surface water is drained. The grating 14a comprises five drainage channels 30a separated by ribs 32a. Three sides of the grating 14a are provided with flanges 40a of uniform width. The flanges 40a include cutouts 42 which are provided to assist keying into the concrete base 36 (best shown in Fig. 3).

The operation of the casting 10a is identical to that of the embodiment hereinbefore described. Road surface water or any other fluid is intercepted by grating 14a and transferred via outlet 22a and pipe 24a to be discharged along the drainage open water course 26a.

Various modifications can be made to the embodiments hereinbefore described without departing from the scope of the invention. For example, any suitable number of channels of acceptable slope can be disposed in the grating and more than one bore may be disposed in the kerb portion. The outlet may also be defined by an integral spigot for connection to a drainage pipe and the device could be provided by a two-piece casting which is fastened or fitted together. For example, the

grating 14 could be cast separately as could the kerb portion 18 and thereafter they could be fastened by bolts, screws or the like before installation in the road surface although it will be appreciated that the provision of a single casting is generally more efficient and easier to manufacture without the step of assembly. The verge or kerb portion need also not be kerb shaped and could comprise a funnel from the channels to the outlet which is covered by a cross-plate of a different shape, for example, curved, to protect the outlet from traffic overrun. The casting may be installed in grass verges. To protect the casting used in such verges from damage caused by the wheels of vehicles mounting the verge, standard transition dropper kerbs may be laid on either side of the casting. Alternatively, splayed kerbs may be laid normal to the channel line of the casting, abutting the ends of the casting. Concrete infill between the kerbs acts as protection for the casting and the outfall pipe. The exposed ends of the kerbs are cut to match the splay or half-batter face of the kerb portion.

The drainage device may be used to drain water from roads in dockland areas and may be installed on small bridges, promenades, seafronts and river embankments. The drainage device may also be used in city centres to drain surface water from a higher level dual carriageway onto the lower lane. The device may be made of other

material than cast iron, for example, a suitable alloy or cast aluminium. Furthermore, the drainage device could be made by injection moulding with a suitable high density plastic material that would stand up to the use requirements.

Advantages associated with the present invention are that the device is relatively straightforward to manufacture and install without the use of skilled labour. Minimal maintenance is required and the outlet pipes from the casting can be readily cleaned by high pressure water jetting or it can be cleaned by rodding in accordance with conventional techniques. The device design ensures minimal risk of deposition of debris such as silt and leaves and it can be installed in a road channel bounded by kerbs or with turved edges. The design also provides a hollow base for mortar fixing.

CLAIMS

1. A drainage device comprising grating means for intercepting and guiding fluids from a road surface to an outlet, and a kerb portion means coupled to said grating means, said kerb portion means defining said outlet.

2. A drainage device as claimed in claim 1 wherein said drainage device is a one-piece metal casting.

3. A drainage device as claimed in claim 1 wherein said drainage device is a two-piece casting consisting of a grating casting portion and a kerb portion casting adapted to be fastened together.

4. A drainage device as claimed in any preceding claim wherein said kerb portion includes an integral spigot which defines said outlet and is adapted to receive the end of a pipe so that water collected by the device can be fed to a drain or open water course.

5. A drainage device as claimed in any preceding claim wherein said grating has a plurality of separate channels which slope towards the kerb portion when in an in-use position, for intercepting and guiding water from the road surface to said outlet.

6. A drainage device as claimed in any preceding claim wherein the kerb portion has a cross-plate disposed above said outlet for protecting said outlet and/or said outlet spigot.

7. A drainage device as claimed in any preceding claim wherein said kerb portion means is shaped to complement the road edge or verge.

8. A drainage device substantially as hereinbefore described with reference to Figs. 1 to 3 or to Figs. 4 and 5 of the accompanying drawings.

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